REMARKS

The present application includes claims 1 and 3-22. Claims 1-22 were rejected by the Examiner. Claims 1, 12 and 19 have been amended by this response. Claim 2 has been canceled by this response.

The Applicant thanks the Examiner for his time in discussing the claims of the present application with Chris George on July 26, 2005. Although no agreement was reached, the Applicant appreciates the Examiner's suggestions and willingness to consider the amended claims for allowance.

By this response, claim 1 has been amended. Claim 1 has been amended to recite that the composite audio signal is a Broadcast Television Standards Committee (BTSC) format composite audio signal. Additionally, the limitations of claim 2 have been incorporated into claim 1 to recite a delay module for delaying the secondary audio program (SAP) information to produce a delayed copy of the SAP information. Furthermore, claim 1 has been amended to recite that the delay module is capable of applying a non-unity delay to the SAP information to produce the delayed copy of the SAP information. Claim 1 has also been amended to recite that the FM demodulator demodulates the SAP information using the non-unity delay and a discrete time index with a combination of the phase-shifted copy of the SAP information and the delayed copy of the SAP information to produce an FM demodulated signal. The prior art does not teach or suggest the combination of the above elements to produce an FM

demodulated SAP signal. Therefore, the Applicant submits that independent claim 1 and dependent claims 3-11 should be allowable.

By this response, claim 12 has been amended. Claim 12 has been amended to recite that the audio signal is a Broadcast Television Standards Committee (BTSC) format audio signal. Claim 12 has also been amended to recite that the FM demodulator demodulates the SAP information using the non-unity delay and a discrete time index with a combination of the phase-shifted copy of the SAP information and the delayed copy of the SAP information to produce an FM demodulated signal. The prior art does not teach or suggest the combination of the above elements to produce an FM demodulated SAP signal. Therefore, the Applicant submits that independent claim 12 and dependent claims 13-18 should be allowable.

By this response, claim 19 has also been amended. Claim 19 has been amended to recite the use of a delay module to produce a delayed SAP signal using a delay, wherein the delay module is capable of applying a non-unity delay to the SAP signal to produce the delayed SAP signal. Claim 19 has also been amended to recite using the delay, a time index, the delayed SAP signal and the signal in quadrature phase in a simple approximation for FM demodulation of the SAP signal. The prior art does not teach or suggest the combination of the above elements to produce an FM demodulated SAP signal. Therefore, the Applicant submits that independent claim 19 and dependent claims 20-22 should be allowable.

Claims 1-2, 8, 12, 15, and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai (U.S. Patent No. 4,486,897) in view of Wang (U.S. Patent No. 6,356,598).

Claims 4, 9-10, 14, 16-17, and 21-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Kammeyer (U.S. Patent No. 4,506,228).

Claims 3, 5-7, 11, 13, 18, and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Collier (U.S. Patent No. 5,404,405).

The Applicant first turns to the rejection of claims 1-2, 8, 12, 15, and 19 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang. As previously discussed, Nagai relates to a system for selecting between sound signals broadcast in two different languages, such as English and Spanish (Abstract; column 1, lines 7-17 and 52-62). Nagai selects between provided signals rather than disclosing improved methods of processing signals. Nagai selects between two bandpass-filtered and FM demodulated signals and a lowpass-filtered signal to provide an output signal (See, e.g., Figures 2-3 and associated text; Abstract; and column 2, lines 3-15).

Nagai neither teaches nor suggests a BTSC-formatted signal, as recited in independent claims 1 and 12. Nagai neither teaches nor suggests use of an approximation or simplification for SAP processing, as recited in independent claim 19 as well as dependent claims 9 and 16. Furthermore, Nagai does not teach or suggest use of a

minimal number of filter coefficients to demodulate an SAP signal, as recited in claim 19. Nagai does not teach or suggest use of a Hilbert filter or phase shift in FM demodulation. Nagai also does not teach or suggest a delay module capable of applying a non-unity delay, as recited in independent claims 1, 12 and 19. Nagai does not teach or suggest using a delay, a discrete time index and a combination of a phase shifted SAP signal and a delayed SAP signal to produce an FM demodulated signal, as recited in independent claims 1, 12 and 19. Rather, Nagai simply selected between two input signals that have been demodulated in a traditional manner. Therefore, Nagai does not teach or suggest either the improved system or the improved method recited in independent claims 1, 12, and 19.

Additionally, Nagai does not teach or suggest the limitations of the dependent claims of the present application. For example, Nagai does not teach or suggest the simplified approximation equation recited in claims 10-11, 17-18 and 22. Nagai also does not teach or suggest normalizing an amplitude of an FM carrier at the FM demodulator, as recited in claims 3, 13 and 20. Certain embodiments normalize the carrier signal and then adjust the carrier signal based on a reference value. Such modification of the FM carrier in the FM demodulator is neither taught nor suggested in the prior art. Nagai does not teach or suggest the filters described in claims 4-8.

Thus, it is clear that Nagai does not teach or suggest the limitations recited in independent claims 1, 12, and 19 and their corresponding dependent claims.

Wang relates to increasing the effectiveness of NTSC co-channel interference detection with a high definition television (HDTV) signal (Abstract; column 8, lines 1-6 and lines 30-46). Wang demodulates a single HDTV signal using a pilot carrier signal, rather than a second audio program signal and does not contemplate a second audio program signal or additional information combined with the HDTV signal (Abstract; column 1, lines 34-38; column 2, lines 4-17). Figures 1 and 3 of Wang illustrate a HDTV signal processing receiver system for processing a single signal that does not teach or suggest the simplified secondary audio program demodulation system of the pending claims. In Wang, the Hilbert filter and delay unit are part of a specific digital demodulator for a single signal and are fed into a multiplier in the demodulator which produces a complex baseband signal, which is output from the demodulator (column 3, lines 60-67 and column 4, lines 1-8). The system of Wang demodulates one VSB-modulated HDTV signal using a pilot signal and a reference pattern but does not teach or envision any secondary audio program signal combined with the HDTV signal (column 4, lines 51-65). The demodulator of Wang neither produces nor discusses a secondary audio program signal.

Thus, Wang does not teach or suggest a system or method for demodulation of secondary audio program information. This limitation is recited in independent claims 1 and 19 of the present application. Rather, Wang does not envision a secondary audio program but instead seeks to improve co-channel interference detection for a HDTV signal. Wang does not teach or suggest a BTSC-formatted signal, as recited in independent claims 1 and 12. Wang neither teaches nor suggests use of an

approximation or simplification for SAP processing, as recited in independent claim 19 as well as dependent claims 9 and 16. Furthermore, Wang does not teach or suggest use of a minimal number of filter coefficients to simplify demodulation of an SAP signal, as recited in claim 19. Wang also does not teach or suggest a delay module capable of applying a non-unity delay, as recited in independent claims 1, 12 and 19. While current approximations utilize a delay of 1 time unit (a unity delay), certain embodiments of the present invention employ a non-unity delay in combination with other recited limitations to allow simplified FM demodulation of a variety of digital signals. Additionally, Wang does not teach or suggest using a delay, a discrete time index and a combination of a phase shifted SAP signal and a delayed SAP signal to produce an FM demodulated signal, as recited in independent claims 1, 12 and 19. Wang just processes an HDTV signal with a pilot carrier using a reference pattern. Therefore, Wang does not teach or suggest either the improved system or the improved method recited in independent claims 1, 12 and 19.

Additionally, Wang does not teach or suggest the limitations of the dependent claims of the present application. For example, Wang does not teach or suggest the simplified approximation equation recited in claims 10-11, 17-18 and 22. Wang also does not teach or suggest normalizing an amplitude of an FM carrier at the FM demodulator, as recited in claims 3, 13 and 20. Certain embodiments normalize the carrier signal and then adjust the carrier signal based on a reference value. Such modification of the FM carrier in the FM demodulator is neither taught nor suggested in the prior art. Wang does not teach or suggest the filters described in claims 4-8.

Thus, it is clear that Wang does not teach or suggest the limitations recited in independent claims 1, 12, and 19 and their corresponding dependent claims.

Although there is no suggestion in the art to combine the language selection system of Nagai with the VSB modulated HDTV system of Wang, even combining Nagai with Wang for the sake of discussion would not teach or suggest the limitations of independent claims 1, 12 and 19 or their dependent claims 3-11, 13-18 and 20-22, respectively, for the reasons described above.

Thus, the Applicant respectfully submits that the Examiner's rejection of claims 1-2, 8, 12, 15, and 19 has been overcome, and claims 1, 8, 12, 15, and 19, and remaining dependent claims 3-7, 9-11, 13-14, 16-18, and 20-22 should be allowable.

Next, the Applicant turns to the rejection of claims 4, 9-10, 14, 16-17, and 21-22 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Kammeyer. As discussed above, neither Nagai nor Wang, alone or in combination, teaches or suggests the limitations of the claimed invention. Kammeyer relates to a traditional FM digital demodulator without simplification or approximation. Additionally, Kammeyer does not contemplate separating a secondary audio program or other data but simply processes a standard FM signal (Abstract; columns 1-2, for example). Kammeyer does not teach or suggest use of a minimal number of filter coefficients to demodulate an SAP signal, nor does Kammeyer teach or suggest a delay module capable of applying a non-unity delay. Additionally, Kammeyer does not teach

or suggest using a delay, a discrete time index and a combination of a phase shifted SAP signal and a delayed SAP signal to produce an FM demodulated signal.

Furthermore, the addition of a lowpass filter from Kammeyer in combination with Nagai and Wang does not teach or suggest all of the limitations of dependent claim 4 or dependent claims 5-8. Additionally, looking at Figures 1-8 and the accompanying description (such as column 3, lines 49 through column 6, line 63), the discussion of Kammeyer relates to a traditional digital frequency demodulator and not the simplified system and method claimed in the present application. For example, the simplified demodulation of claims 9 and 16 and the equation of claims 10, 17, and 22 neither taught nor suggested anywhere in Kammeyer (or in Nagai or Wang).

Thus, Kammeyer does nothing to cure the deficiencies of Nagai and Wang with respect to the claims of the present application. The theoretical combination of Nagai, Wang, and Kammeyer does not teach or suggest all of the limitations of the claimed invention. Therefore, claims 4, 9-10, 14, 16-17, and 21-22, as well as remaining claims 1-3, 5-8, 11-3, 15, and 18-20, should be allowable.

Next, the Applicant turns to the rejection of claims 3, 5-7, 11, 13, 18, and 20 under 35 U.S.C. § 103(a) as being unpatentable over Nagai in view of Wang and further in view of Collier. As discussed above, Nagai and Wang, taken alone or in combination, do not teach or suggest the limitations of the claimed invention. Collier relates to FM stereo decoding of a traditional FM signal using a phase locked loop (Abstract; column 1, lines 62-66). Collier regenerates a 38 kHz subcarrier from a 19 kHz pilot signal while

maintaining exact phase coherence between the signals (column 1, lines 67-68 and column 2, lines 1-2). Rather than processing a composite signal with secondary audio program information, Collier processes an FM stereo signal using a pilot carrier (Fig. 1; column 1, line 62 – column 2, line 45).

Collier does not teach or suggest use of a minimal number of filter coefficients to demodulate an SAP signal, nor does Collier teach or suggest a delay module capable of applying a non-unity delay as recited in claims of the present application. Additionally, Collier does not teach or suggest using a delay, a discrete time index and a combination of a phase shifted SAP signal and a delayed SAP signal to produce an FM demodulated signal. Further, Collier does not teach or suggest the simplified approximation equation recited in claims 10-11, 17-18 and 22. Collier also does not teach or suggest normalizing an amplitude of an FM carrier at the FM demodulator, as recited in claims 3, 13 and 20. Certain embodiments normalize the carrier signal and then adjust the carrier signal based on a reference value. Such modification of the FM carrier in the FM demodulator is neither taught nor suggested in the prior art. In addition, Collier does not teach or suggest the filters described in claims 4-8.

Thus, Collier does not cure the defects in Nagai and Wang, and the theoretical combination of Nagai, Wang, and Collier does not teach or suggest the limitations of the claimed invention. Therefore, claims 3, 5-7, 11, 13, 18, and 20, as well as remaining claims 1, 4, 8-10, 12, 14-17, and 19-22, should be allowable.

The Applicant respectfully submits that the cited prior art does not teach or suggest the limitations of the claimed invention in their entirety. Therefore, the Applicant respectfully submits that claims 1 and 3-22 should be allowable.
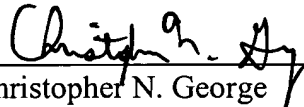
CONCLUSION

The Applicant respectfully submits that the present application is in condition for allowance. The Applicant thanks the Examiner for his work in examining the application and the prior art. If the Examiner has any questions or the Applicants can be of any assistance, the Examiner is invited and encouraged to contact the Applicants at the number below.

The Commissioner is authorized to charge any necessary fees or credit any overpayment to the Deposit Account of MHM, Account No. 13-0017.

Respectfully submitted,

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